



Arizona Department of Transportation

STATE ENGINEER'S OFFICE

MEMORANDUM

To: ITD Employees

Date: June 23, 2005

From: Sam Maroufkhani, Acting State Engineer

SM

Subject: CADD Electronic Files Archiving Process

Effective July 1, 2005, all ADOT Project Managers will implement the ADOT CADD Files Archiving Process.

The attached document titled "Computer-Aided Design and Drafting (CADD) Standards For All Project Related Deliverables" outlines what files are to be provided and how the files are to be submitted for archiving for each Design Technical Unit. At this time the ADOT Archiving Team is focusing upon the method for archiving the "As-Bid" electronic files. After this process is implemented, the Team will focus on the "As-Built" process. The CADD Archiving Process will be the standard method for both ADOT staff-designed projects as well as consultant-designed projects.

The primary Project Manager is central to a project. The Project Manager role is crucial to ensuring that all Design Technical Units' Project data is archived at the same time. (See attached ADOT CADD Files Archiving Process Flow Chart.)

A new ITD policy regarding the ADOT CADD Files Archiving Process is in process. Upon completion of the policy, you will be advised when the policy is available on the intranet website.

Your cooperation is appreciated to implement this process that will assure ADOT has ready access to all Electronic CADD files they have commissioned.

ADOT CADD Files Archiving Process*

Task Level Map

DEFINITIONS:

ADOT Standards - ADOT Design Software (MicroStation, et al) Resource files, Design Criteria and Drafting Guidelines.

C&S - Contracts & Specification Services.

CAE - The Computer Aided Engineering Archive Liaison.

Final Archive - The Final Archive Folder is on \\e980ts04\Archive.

FTP Site** - File Transfer Protocol (FTP). An Electronic site for Design Consultants to use to transfer Electronic Files through ADOT's firewall.

PM - The ADOT Project Manager responsible for all project related activities.

SWRD - Statewide Record Drawings Liaison.

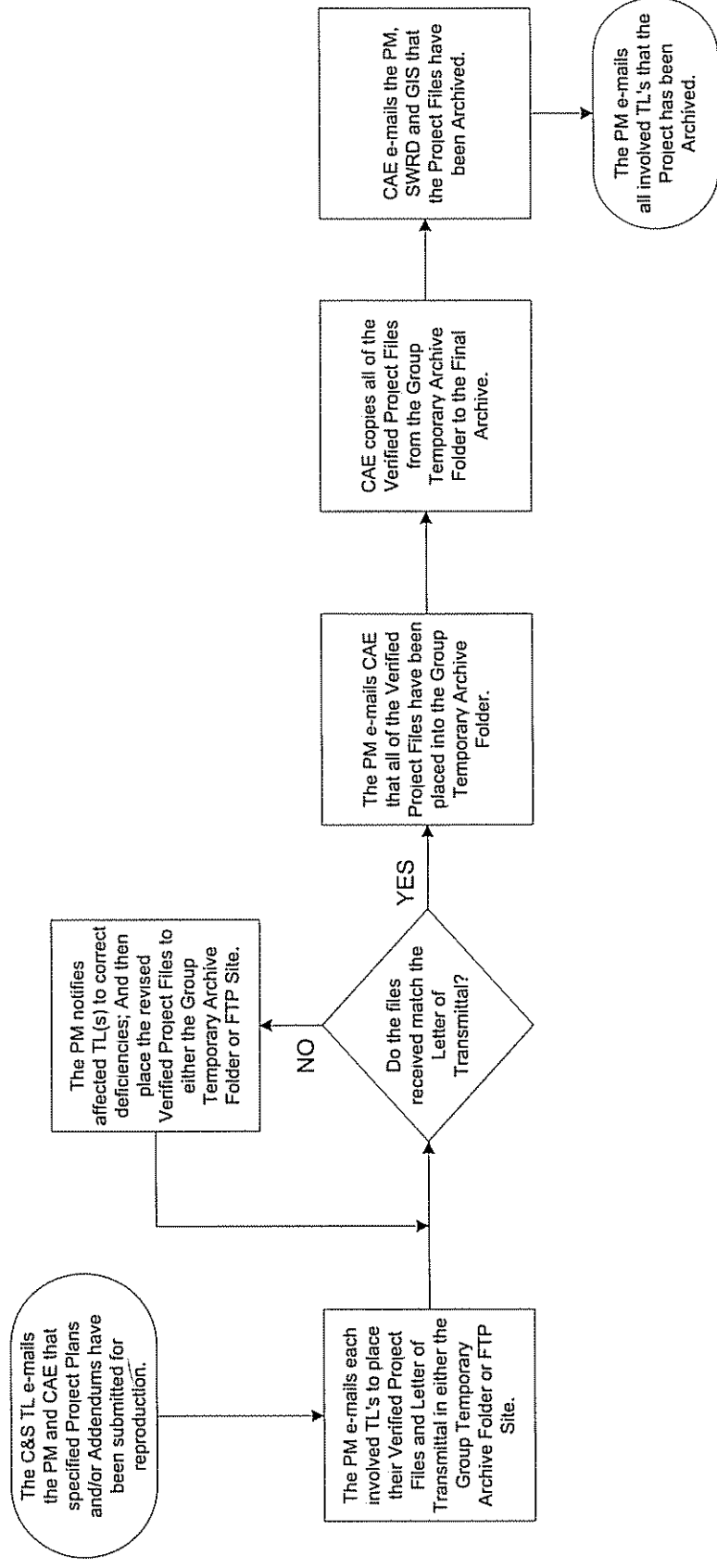
Temporary Archive Folder ** - An Electronic site for ADOT Design Groups Electronic Files (\\e980ts04\MSV7).

TL - The Technical Leader of individual Design Units (ADOT or Consultant), responsible to assure that all CADD Files have been completed in ADOT

Standard File Format.

Verified - The PM confirms with the TL that all related files & file-formats have been received, and meet ADOT Standard file formats. It will not be necessary for the PM to check the information confirmed within the files.

** If these Electronic Folders are not used, the Design Units (ADOT or Consultant) have the option to submit two (2) copies of their Electronic Files on Compact Discs to be delivered to the PM.



* Archive Process Excludes Materials Group and Engineering Surveys

Computer-Aided Design and Drafting (CADD) Standards for all Project related Deliverables.

ADOT shall retain all rights and ownership of all Electronic Files and Hardcopy Deliverables throughout the Design Phases.

General Specifications:

All drawings to be archived shall conform to ADOT drafting and CADD standards. The current ADOT approved version of Bentley's MicroStation software will be used. All graphic files shall be provided in MicroStation native design file format (.dgn), and contain data in vector format only. Digital Terrain Model (.dtm) files shall be produced with Bentley's InRoads/Site/Survey Select Cad compatible file formats. Raster data shall not be accepted unless otherwise stated by ADOT. Use of non-MicroStation vector format and subsequent translation of graphic files to the .dgn format shall not be acceptable. No zipped files shall be accepted. Reference files are not to be copied into the plan sheets master file. All electronic "design sheets" will be delivered in a typical "Plan View" (dependant upon sheet contents) in view 1. ADOT cells are not to be modified unless approved by ADOT.

All final Consultant project Electronic CADD data files may be delivered through a File Transfer Protocol (FTP) Site. Alternatively, two (2) copies of the electronic files shall be submitted on CD-Rom (multiple CD's shall be allowed). All final project documentation, electronic files (.dgn, ASCII, .alg, .dtm, project wide reference files, etc.) and hard copy, shall be packaged separately, suitably labeled and delivered to the assigned ADOT primary Project Manager, and/or to the Technical Leader as identified below.

All deliverables shall contain an electronic Index of files and a letter of transmittal to the designated areas and all CD's must be labeled with the information stated below:

- **Identification Label For CD and Case:**
 - Prepared By:
 - Federal Project Number:
 - Route:
 - Milepost (Beginning/Ending):
 - Prefix (Rt, Co, MP) and TRACS Number:
 - Project Name:
 - Type of Files:
 - Creation Date:
 - Disc (#) of (total #)

In addition to the requirements stated above in the General Specifications, all designers of ADOT projects shall provide the following information requested by the individual areas. If unclear about items needed for your project, please contact the Project Manager.

Bridge:

Identification Label

1. Structure Number (4 digit number)
2. Structure Name (Wildcat Wash Bridge)
3. Type of work category:
 - a) Major Structure – New Bridge
 - b) Bridge Replacement
 - c) Minor Structure
 - d) Deck Rehabilitation
 - e) Hinge, Deck or Joint Repair
 - f) Barrier Replacement
 - g) Bridge Widening
 - h) Scour Protection
 - i) Seismic Retrofit

Materials:

(Geotech)

In addition to the CADD requirements stated in the General Specifications, all Consultants of ADOT Geotech projects shall provide the following information to the Project Engineer for ADOT Geotech Section:

1. One (1) Electronic Copy of the final Geotech Design sheets submitted on CD-Rom.
2. One (1) half-size (11"x17") print of the Geotech sealed and signed final design sheets.

Roadway Engineering:

See General Specifications.

Right of Way:

All R/W plans are to conform to current R/W Plans Standards and Manual.

Final Task Submittal FINAL R/W PLANS

When all comments have been addressed, the designers of ADOT projects shall submit the following:

1. Beginning and Ending Mileposts in tenths of a mile
2. Revised Calculation Book sheets and Point ID sheets, if necessary.
3. An ASCII coordinate electronic file in the following format: Point Number, Northing, Easting, and Description using commas as delimiters. The designers of ADOT projects shall ensure that this file is free of extraneous text such as page numbers, headers, batch commands, and the like. This file shall be such that it can be imported into a COGO program without reformatting by ADOT Right of Way Plans Section. Only numeric numbers shall be accepted.
4. One (1) half-size print of the Final Right of Way Plans set.
5. Full-size set of Sealed and Signed Mylar's trimmed to 22" x 34"

Traffic Engineering:

Upon Final Design Approval for any and all work that involves Traffic Engineering/Design, the Traffic Engineering Group requires that the following CADD related deliverables be submitted to the Primary Project Manager as indicated in the General Specifications. In addition, a copy of the Letter of Transmittal indicating all Traffic related deliverables have been submitted to ADOT shall be forwarded to the Traffic Engineering Project Manager for approval.

1. All SignCad files shall be submitted in ADOT's current version of SignCad (.SGN).
2. All Design CADD files associated with Traffic Design, including Traffic Signals, Signing, Pavement Marking, Traffic Control, Pre-Design, HES Projects, and Permit Designs, shall be submitted in ADOT's current version of MicroStation 2D format (.DGN)(2D).

Engineering Surveys:

(Location Surveys and Photogrammetry)

In addition to the CADD requirements stated in the General Specifications, all designers of ADOT projects shall provide the following information to the Engineering Survey Section:

1. Ground Adjustment Factor (G.A.F.):
2. Contour Interval (C.I.):
3. Project Scale:
4. Horizontal and Vertical Datums:
5. Arizona Zone:
6. Hard copy of reports including any plots

Based on the Scope of Work, select the items to be delivered:

1. Hard Copies shall consist of the following:
 - a) Field notes
 - b) Sketches
 - c) Transit and Level books
 - d) Plots
 - e) Reports
2. (.dgn) file containing graphical representation of the project (i.e. Planimetrics and contours).
3. (.3d) file containing graphical representation (i.e. breaklines and random points) to produce the DTM.
4. (.dtm) containing Engineering Surveys approved features that make up a correct surface representation.
5. (.alg) file containing the project alignments. (.rpt) file including curve data from the alignment.
6. ASCII (.csv) files shall contain the following:
 - a) File Header information:
 - i. Project GAF
 - ii. Project Datums
 - iii. Arizona Zone
 - iv. Basis of Alignment
 - v. Basis of Stationing
 - vi. Basis of Horizontal Control
 - vii. Basis of Elevation
 - viii. Basis of Bearing
 - a) All Project Control
 - b) Section Corners
 - c) R/W Monumentation
 - d) Structures
 - e) Edge of pavement
 - f) Centerline and driving stripes
 - g) Other features as requested

Note: Two (.csv) files shall be submitted, one containing the RAW survey data and another containing the Edited survey data.

1. All Film Negatives used to map a project
2. Scanned Images and/or Diapositives used to map project
3. Aerotriangulation files used to control photography
4. Orthophotos produced for the mapping project
5. Record of Survey: When requested, Record of Survey shall be in electronic (.dgn / .pdf) format with a stamped original.
6. Pictures: Upon Request pictures shall be taken for all structures including end of pipes, and headwalls, caps, and any un-natural terrain feature in a (.jpg or .bmp) file format (check scope of work).

If unclear about items needed for your project, please contact the Engineering Survey Section.

ADOT PROJECT MANAGER:

All survey and photogrammetry projects shall be submitted to the Engineering Survey Section through the ADOT and Consultant Project Manager, for verification of deliverables and archiving purposes. A notification of findings shall be sent to the Project Manager after completion of project review.